

ABSTRACT

In a gas humidifier used for humidifying fuel in a molten carbonate fuel cell (MCFC), a small-size gas humidifier is achieved by carrying out a steam-generating process and a gas humidifying process by the use of the steam by using a single unit. In order to achieve this structure, a plurality of longitudinal tube plates are laminated in a thickness direction with predetermined intervals so that a heat-exchanger core (100) of a plate-fin type is prepared. Heating-use high-temperature fluid (A) is allowed to flow alternately through a plurality of spaces that are formed inside the heat-exchanger core (100) and placed side by side in the horizontal direction so as to direct a gas to be humidified (B) to another space from above to below. An injection tube (210), which is used for spraying liquid (C) that serves as a steam source, is inserted virtually horizontally along tube plates on two sides in an upper portion of each space through which the gas to be humidified (B) flows. A header pipe (220), which is used for supplying the liquid (C) to the injection tube (210), is connected to the injection tube (210) at a place apart from the heat-exchanger core (100). One portion of the gas to be humidified (B) that has been introduced into the heat-exchanger core (100) is allowed to flow outside the heat-exchanger core (100) and to contact the header pipe (220) placed outside thereof.